

REMARKS/ARGUMENTS

Introduction:

Claim 60 is amended, and claims 68-70 are new. Claims 47-49, 52-55, and 60-70 are now pending in the application. (Claims 1-46, 50, 51, and 56-59 were previously canceled.) Applicants respectfully request reexamination and reconsideration of the application.

Applicants note that the amendment to claim 60 was to clarify the claim and not for reasons of patentability.

Objection To The Drawings:

The drawings were objected to on the grounds that the drawings allegedly do not show "the structure of the claimed semiconductor device." The PTO further states that "the structure of the claimed semiconductor device must be shown or the feature(s) canceled from the claim(s)." Applicants respectfully traverse this objection on the grounds that it is not applicable to a product-by-process claim.

Although the drawing requirements relied on by the PTO are applicable to the vast majority of claim types examined by the PTO, those drawing requirements are not applicable to product-by-process claims, like the claims pending in this application. Indeed, the MPEP describes product-by-process claims as having a "peculiar nature." (MPEP § 2113, section entitled "Once A Product Appearing To Be Substantially Identical Is Found And A 35 U.S.C. 102/103 Rejection Made, The Burden Shifts To The Applicant To Show An Unobvious Difference.") Unlike typical product claims, the structure of the claimed product is not recited in a product-by-process claim; rather, the product is claimed in terms of a process of making the product. No PTO rule requires that descriptions not recited in a claim be shown in the drawings. It follows that the structure of a product that is the subject of a product-by-process claim need not be shown in the drawings. Indeed, the inapplicability of such a drawing requirement is evident from the remedy proposed by the PTO: applicants cannot cancel "the structure of the claimed semiconductor device . . . from the claim(s)" because the structure is not recited in the claims. Or put another way, because the pending claims do not recite the structure of the claimed semiconductor die, the pending claims already comply with the requirement that "the structure of the claimed semiconductor device . . . [be] canceled from the claim(s)."

For all of the foregoing reasons, Applicants respectfully assert that no court case, statute,

PTO rule, or section of the MPEP requires that the structure of the semiconductor dies of the claims in this application be shown in the drawings. Applicants further assert that the drawings show non-limiting examples (e.g., Figure 2C as amended in the Amendment dated June 1, 2006) of the process recited in the claim, and the drawings are therefore in full compliance with all applicable rules. Applicants accordingly request that the objection to the drawings be withdrawn.

Applicants note that the MPEP recognizes that "[t]he lack of physical description in a product-by-process claim makes determination of the patentability of the claim more difficult." (MPEP § 2113, subsection entitled "The Use Of 35 U.S.C. 102/103 Rejections For Product-By-Process Claims Has Been Approved By The Courts.") To compensate, the MPEP states that, among other things, "[t]he Patent Office bears a lesser burden of proof in making out a case of *prima facie* obviousness for product-by-process claims . . . than when a product is claimed in the conventional fashion." (MPEP § 2113, subsection entitled "Once A Product Appearing To Be Substantially Identical Is Found And A 35 U.S.C. 102/103 Rejection Made, The Burden Shifts To The Applicant To Show An Unobvious Difference.")

Rejection Under 35 USC 112, First And Second Paragraphs:

Claims 47-49, 52-55, and 60-67 were rejected under 35 USC 112, first paragraph, as allegedly failing to comply with the written description requirement. Applicants respectfully traverse this rejection and assert that the specification meets the written description requirement with respect to the claims. For example, Figure 2C illustrates a non-limiting example in which an exemplary blade 22 and an exemplary terminal 44 are forced into contact one with another. Applicants therefore request that the rejection under 35 USC 112, first paragraph, be withdrawn.

Claims 47-49, 52-55, and 60-67 were also rejected under 35 USC 112, second paragraph, on two grounds: (1) allegedly the recitation at lines 4 and 5 of claim 60 is unclear, and (2) examples of the structure of the resulting semiconductor die are allegedly not disclosed in the specification. Applicants respectfully traverse these rejections.

As discussed above, Figure 2C illustrates a non-limiting example of the recitations at lines 4 and 5 of claim 60. Applicants thus assert that the recitations at lines 4 and 5 of claim 60 are sufficiently clear to meet the requirements of 35 USC 112, second paragraph.

Moreover, as also discussed above, the claims do not recite a structure of the claimed semiconductor die, and therefore the specification need not disclose exemplary possible structures of the claimed semiconductor die. Indeed, there is no statute, PTO rule, MPEP section, or court case that requires that examples of structures of a product claimed in product-by-process format be disclosed in the specification. As discussed, perhaps because no such requirement exists, the courts have reduced the PTO's initial burden in establishing a *prima facie* case of obvious with respect to a claim in product-by-process format. (See MPEP 2113, subsection entitled "Once A Product Appearing To Be Substantially Identical Is Found And A 35 U.S.C. 102/103 Rejection Made, The Burden Shifts To The Applicant To Show An Unobvious Difference.") At least because there is no requirement that examples of structure of a product claimed in product-by-process format be disclosed in the specification, the rejection of the claims under 35 USC 112, second paragraph, should be withdrawn.

Rejection In View Of Prior Art:

Claims 47-49, 52-55, and 60-67 were rejected under 35 USC 102(b) as anticipated by US Patent No. 5,177,438 to Littlebury et al. ("Littlebury"). Applicants respectfully traverse this rejection.

As noted above, because of what the MPEP refers to as "their peculiar nature," product-by-process claims are examined differently than other types of claims. In determining whether a product-by-process claim is patentable, "[t]he structure *implied by* the process steps" recited in the claim must be compared to the structure of prior art products. (MPEP § 2113 subsection entitled "Product-By-Process Claims Are Not Limited To The Manipulations Of The Recited Steps, Only the Structure Implied By The Steps" (emphasis added).) As also noted above, due to possible initial difficulty in determining structure implied by the recited process steps, the examiner "bears a lesser burden of proof in making out a case of *prima facie* obviousness." Thus, in initially rejecting product-by-process claims, the examiner need only provide "a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art." "[T]he burden then shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product." (MPEP § 2113, subsection entitled "Once A Product Appearing To Be Substantially Identical Is Found And A 35

U.S.C. 102/103 Rejection Made, The Burden Shifts To The Applicant To Show An Unobvious Difference.")

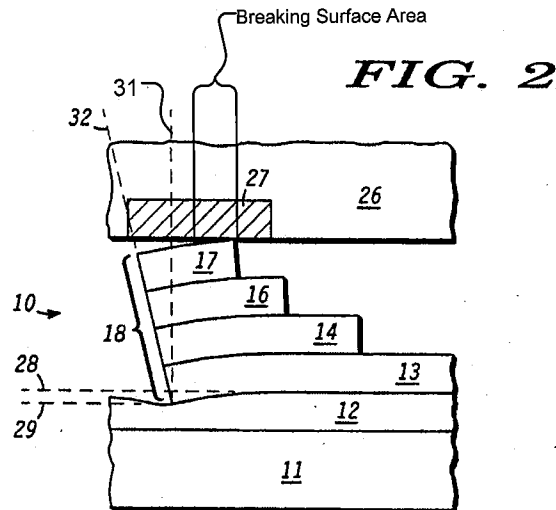
Here, the Examiner has done his part in establishing an initial rejection. Applicants now do their part and show unobvious differences between the claimed semiconductor die and Littlebury. As discussed below, because of the shape and configuration of Littlebury's contacts 18, those contacts "break"—i.e., smash (see the Appendix attached hereto)—through oxide on the bonding pad 27 of Littlebury's die 26 and in the process leave much larger marks on the die terminals than are left on the terminals of the semiconductor die claimed in the present application. As discussed in detail below, the foregoing, Applicants assert, is a patentable difference between the semiconductor die of the claims of the present application and Littlebury's die 26.

As is known in the industry, semiconductor dies are typically tested by forcing probes and terminals of the dies into contact. Test signals can then be passed to and from the dies via the temporary electrical connections established between the probes and the dies. The act of forcing the probes and terminals of the dies into contact unavoidably causes the contact tips of the probes to create marks, which are often called scrub marks, on the terminals.

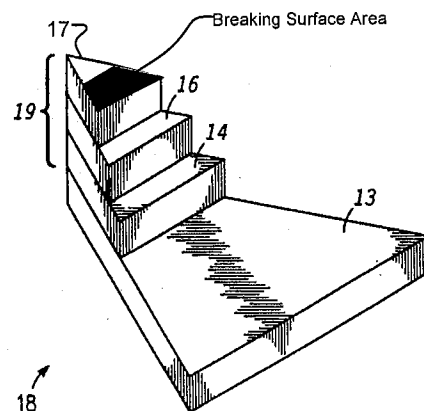
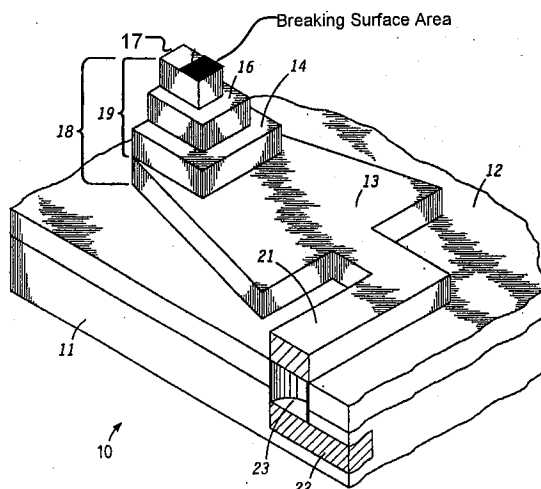
Smaller scrub marks on the die terminals are significantly more advantageous than larger scrub marks because scrub marks on terminals of a semiconductor device can cause several problems. First, scrub marks create a rough, uneven surface on the terminal that can prevent a wire from being bonded to the terminal. (The terminals of a semiconductor device are often connected to conductors of a protective package by wires.) Second, even if a wire is successfully bonded to a terminal with a scrub mark, the scrub mark can decrease the effective life of the bond between the wire and the terminal. Third, a scrub mark can weaken a terminal, causing the terminal to loosen or even detach from the semiconductor device. (See U.S. Patent No. 5,506,499 to Puar ("Puar"), col. 2, lines 21-40 and col. 3, lines 7-25 for a discussion of the detrimental effects of scrub marks.) While it is typically not possible to prevent a probe tip from creating a scrub mark on a die terminal, decreasing the size of the scrub mark made by a probe tip can substantially reduce or even eliminate the foregoing problems.

As shown in Figure 2 (which is reproduced below with annotations) of Littlebury, a rear portion—identified as a "breaking surface area" in Figure 2 below—of cap 17 is the active

contact area that engages bonding pad 27 and thus creates the scrub marks on pad 27. As can be seen in Figures 1 and 3A of Littlebury



(which are reproduced below with annotations), the rear portion—colored black and labeled "breaking surface area" in Figures 1 and 3A below—is blunt and flat. Not surprisingly, Littlebury describes the action of the cap 17 utilizing the words "breaks" (Littlebury col. 1, line 62) and "break" (Littlebury col. 4, line 31). The word "break" means "to smash, split, or divide into parts violently" (see the Appendix attached hereto). Littlebury thus teaches utilizing the blunt, flat rear portion of cap 17 to smash through oxide on pad 27. The resulting scrub mark made on pad 27 by cap 17 is therefore necessary relatively large and wide.



In contrast, in independent claim 60, "blades" contact terminals of the die. By definition, a blade is the "**cutting** part of a sword, knife, etc." (See the Appendix attached hereto.) The word "cutting" means "to penetrate with or as if with a sharp-edged instrument or object." (See the Appendix attached hereto.) The blades of claim 60 are thus sharp-edged instruments that "cut" through oxide on the die terminals and therefore necessarily leave a very thin, sliced scrub mark on the die terminals. A difference therefore between the die of claim 60 and Littlebury's die is in the scrub marks on the terminals or pads: Littlebury's pads will have relatively large, wide scrub marks, while the terminals of the die of claim 60 will have very thin slice marks. Moreover, as discussed above, the much thinner, smaller scrub marks on the terminals of the die of claim 60 are significantly more advantageous than the much wider, larger scrub marks on the pads of Littlebury's die. For at least this reason, the semiconductor die of claim 60 is patentable over Littlebury's die.

Applicants note the PTO's assertion that Littlebury's cap 17 can be considered sharpened because cap 17 is smaller than layer 16. (See, e.g., Figure 1 of Littlebury.) Applicants respectfully assert that an object cannot be considered "sharpened" or a "blade" merely because the object is placed on a larger object. Indeed, absurd conclusions would result if any object—no matter how blunt—were considered sharp or a blade by merely placing the object on a larger object. For example, the flight deck of an aircraft carrier cannot be deemed sharp or a blade merely because the aircraft carrier is placed on a larger object, like a dry dock.

Claims 47-49, 52-55, and 61-67 as well as new claims 68-70 depend, directly or indirectly, from claim 60 and are, at least because of that dependency, also patentable over Littlebury. Moreover, claims 47-49, 52-55, and 61-70 recite addition features not taught or suggested by Littlebury. For example, claims 52 and 68 recite that "said blade comprises a sharpened edge along said length thereof," claim 63 recites that "the blades cut through oxide layers formed on the terminals," and claims 69 and 70 recite tapered portions of the blades. In accordance generally with the discussion above regarding claim 60, such features of the blades will result in a semiconductor die with terminals having very thin, small scrub marks, which patentably distinguishes over Littlebury's die. For at least the foregoing reasons, claims 47-49, 52-55, and 61-70 further distinguish over Littlebury.

Conclusion:

In view of the foregoing, Applicants submit that all of the claims are allowable and the application is in condition for allowance. If the Examiner believes that a discussion with Applicants' attorney would be helpful, the Examiner is invited to contact the undersigned at (801) 323-5934.

Respectfully submitted,

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By /N. Kenneth Burraston/
N. Kenneth Burraston
Reg. No. 39,923

Kirton & McConkie
1800 Eagle Gate Tower
60 East South Temple
P.O. Box 45120
Salt Lake City, Utah 84111-1004
Telephone: (801) 323-5934
Fax: (801) 321-4893

APPENDIX

From online dictionary available at www.dictionary.com:

blade

1. the flat cutting part of a sword, knife, etc.

break

1. to smash, split, or divide into parts violently; reduce to pieces or fragments.

cut

1. to penetrate with or as if with a sharp-edged instrument or object.

sharp

1. having a thin cutting edge or a fine point; well-adapted for cutting or piercing.